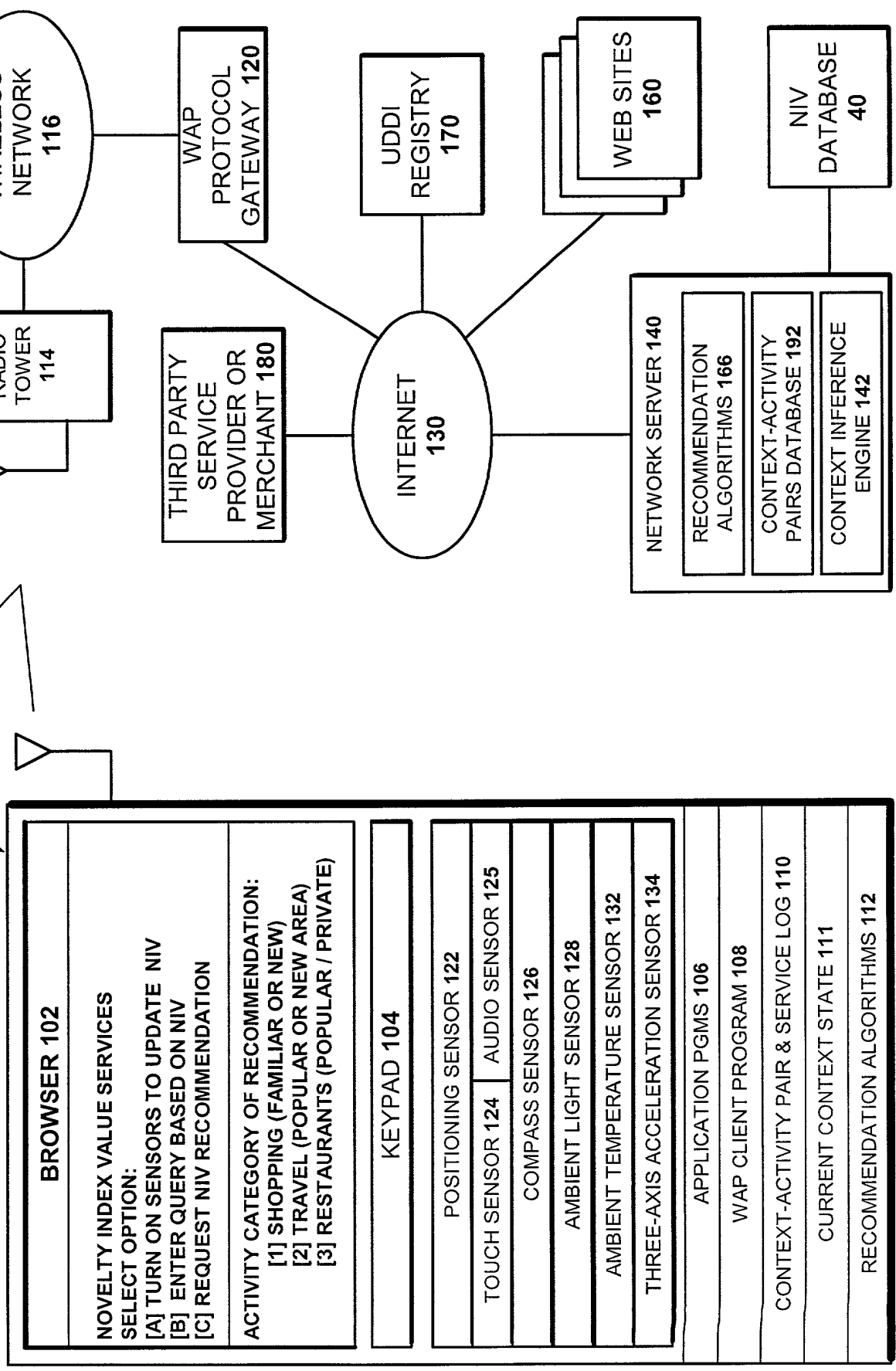
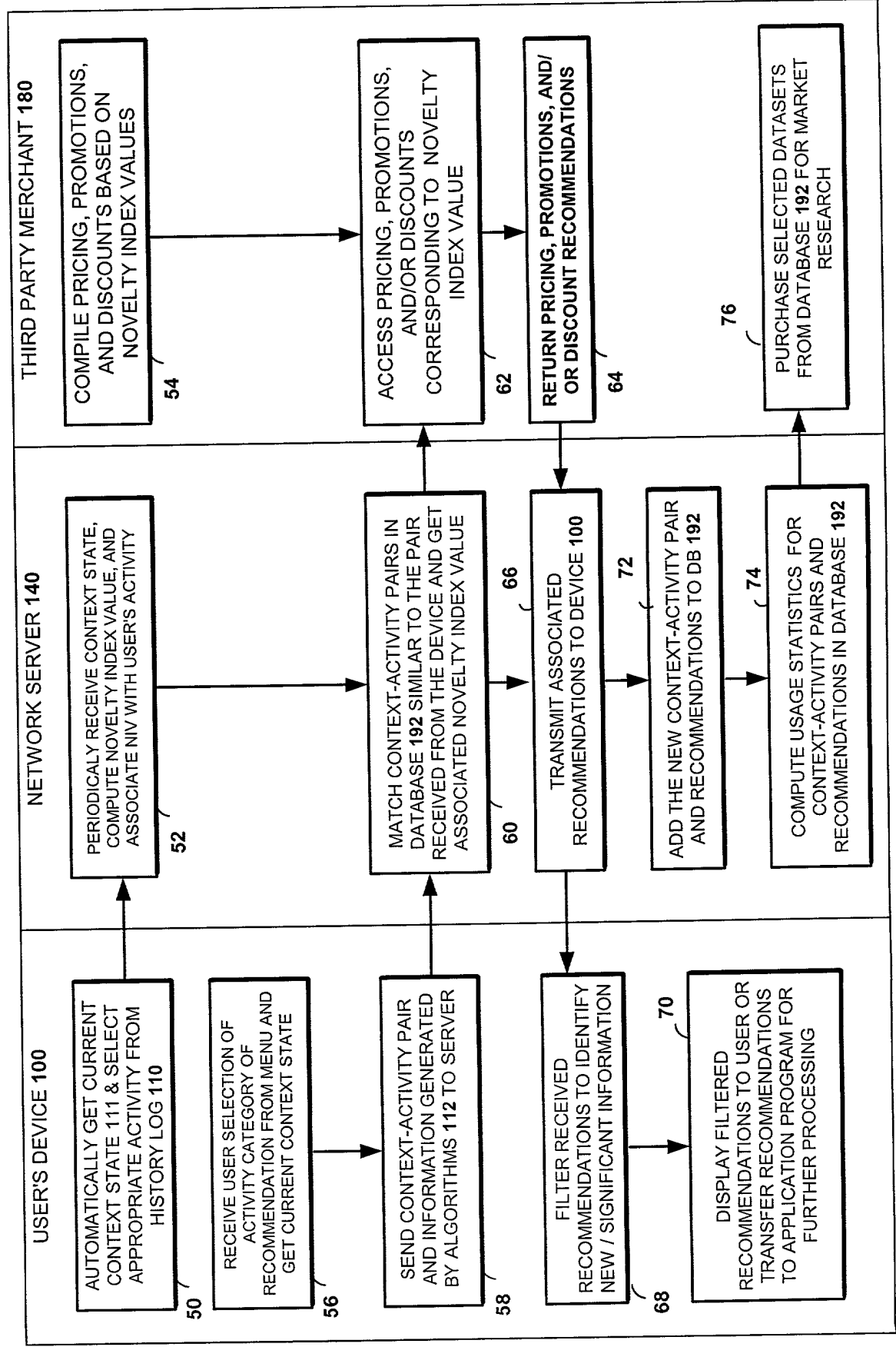


Figure 1

FIG. 1A WIRELESS DEVICE 100



NIV-DATA GATHERING AND NIV-BASED RECOMMENDATIONS



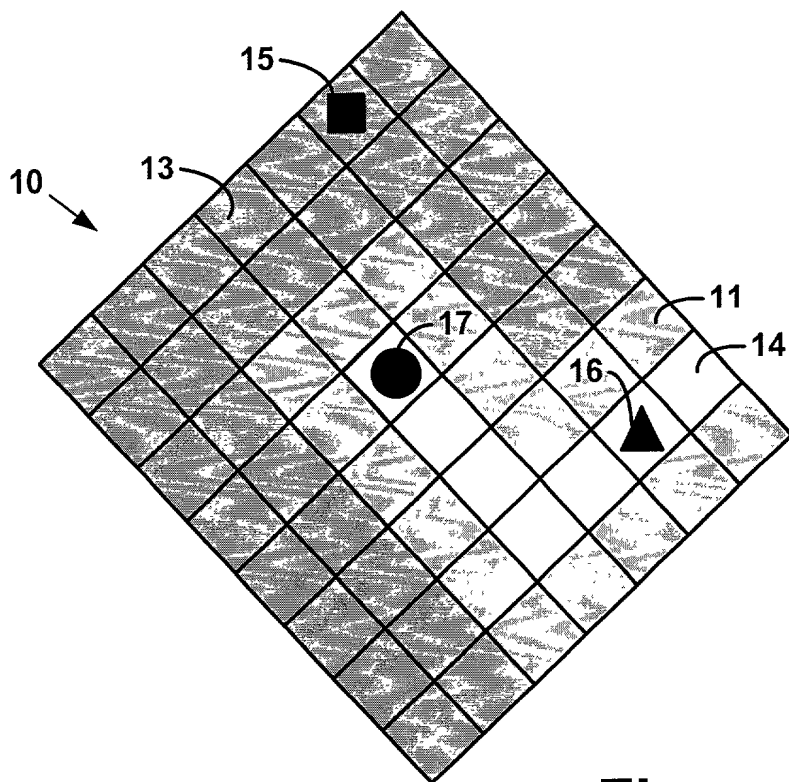


Figure 2

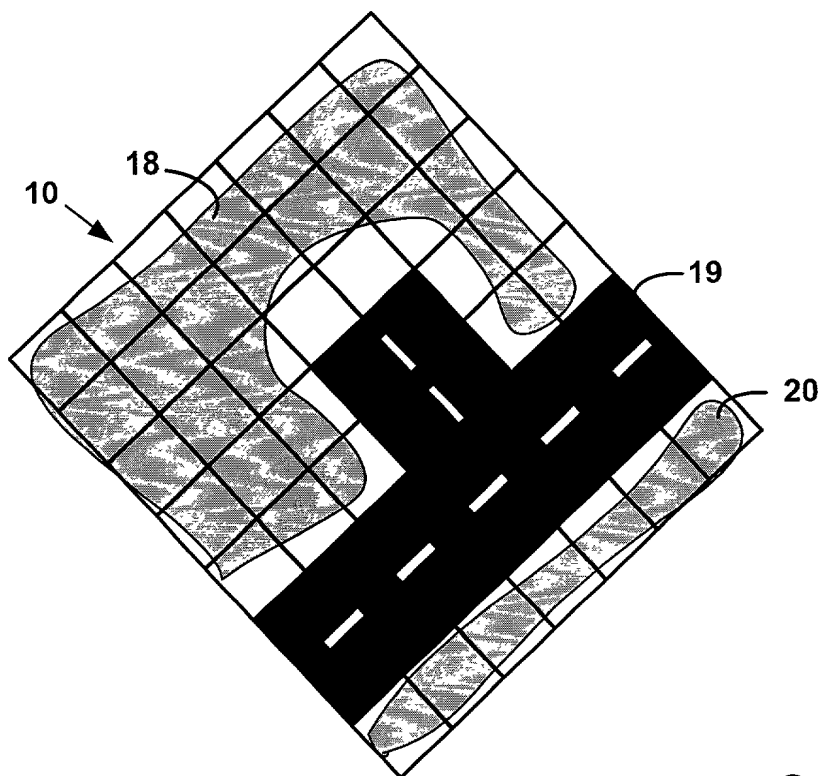
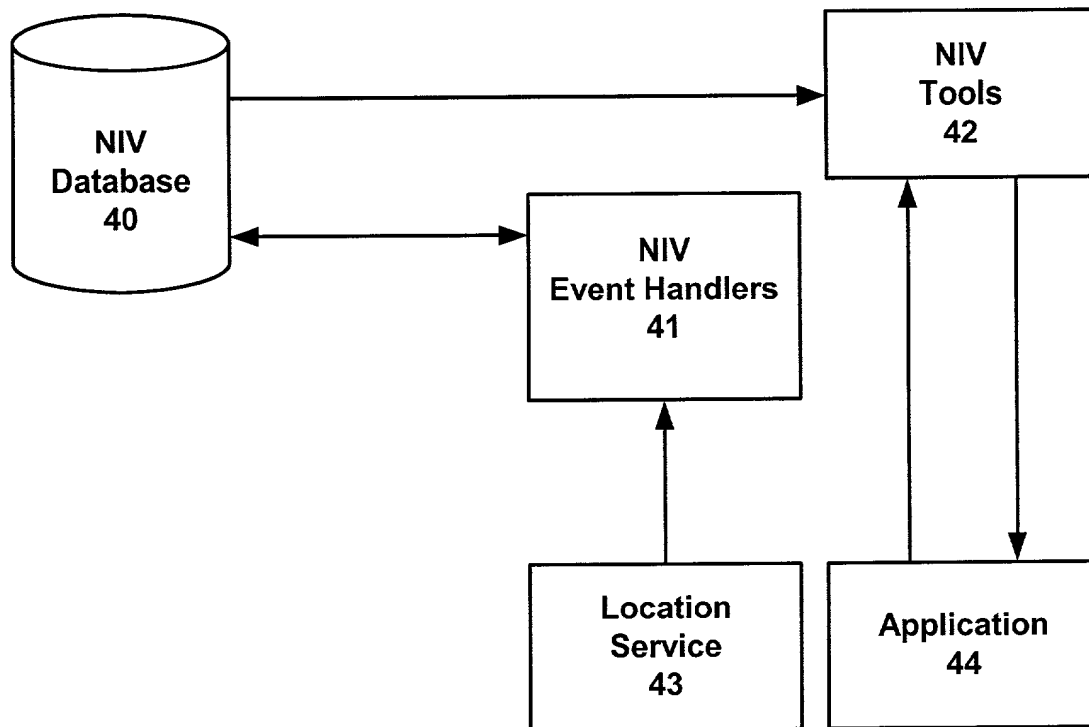


Figure 2A



**Figure 3**

WIRELESS DEVICE 100

WIRELESS DEVICE 100

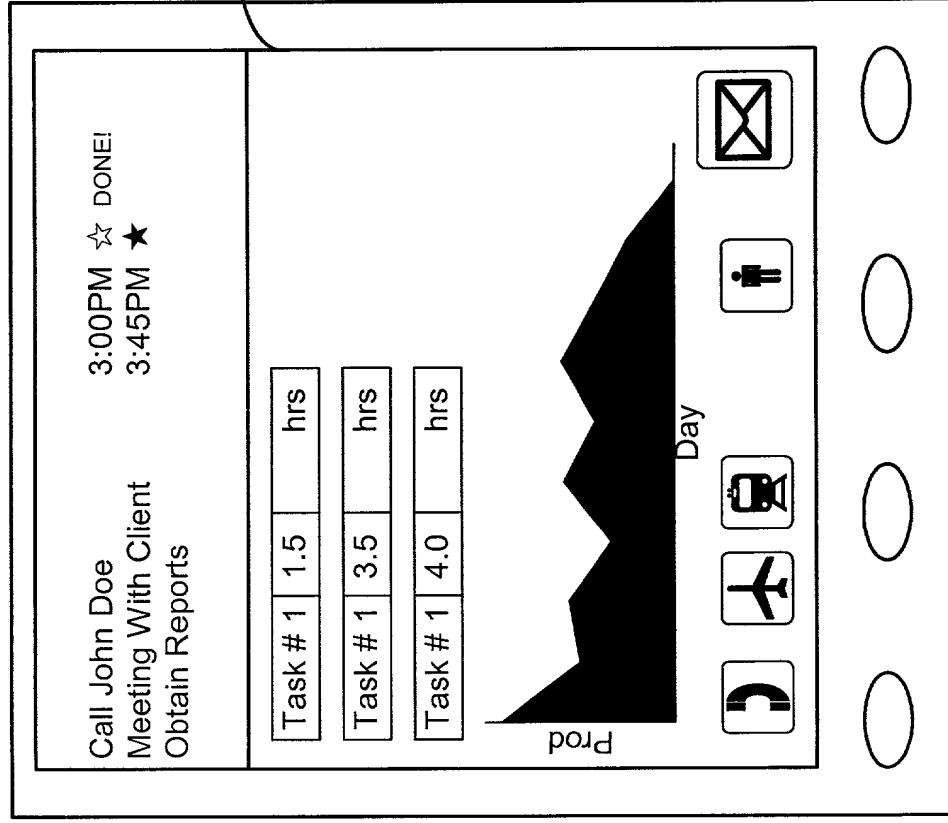


Figure 4

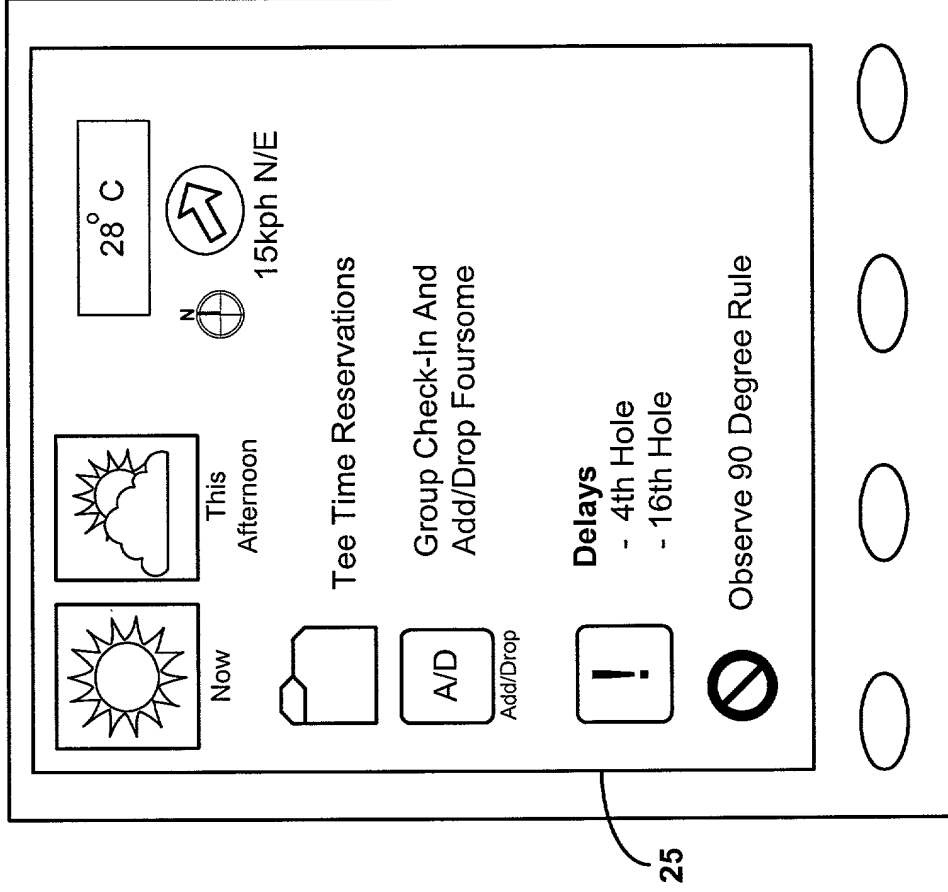


Figure 4A

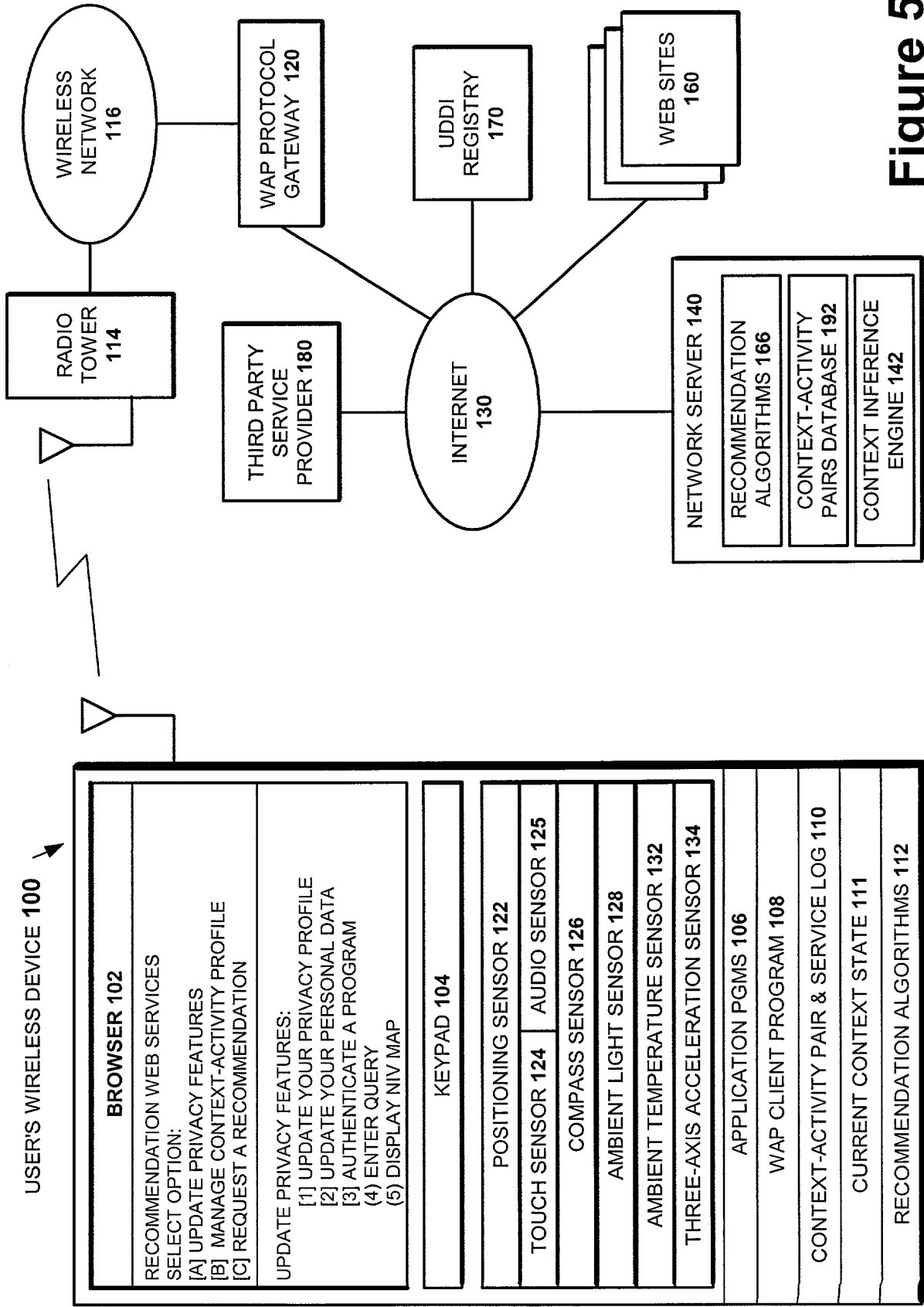


Figure 5

USER'S WIRELESS DEVICE 100

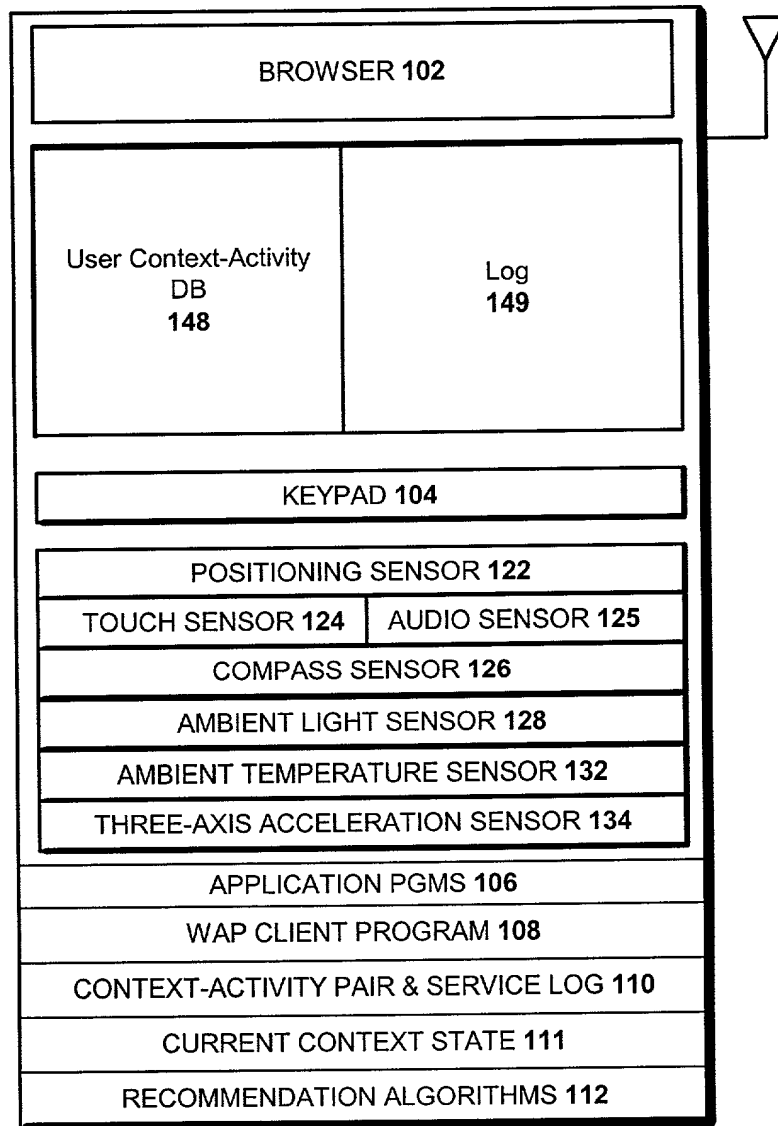


Figure 6



USER'S WIRELESS DEVICE 100

BROWSER 102
UPDATE PRIVACY FEATURES: <ul style="list-style-type: none"><li>[1] UPDATE YOUR PRIVACY PROFILE<ul style="list-style-type: none"><li>[a] Add a local program to permissions list</li><li>[b] Remove a local program from list</li><li>[c] Add a server program to permissions list</li><li>[d] Remove a server program from list</li><li>[e] Add a network program to permissions list</li><li>[f] Remove a network program from list</li></ul></li><li>[2] UPDATE YOUR PERSONAL DATA<ul style="list-style-type: none"><li>[a] Update server database</li><li>[b] Update network database</li></ul></li></ul>
KEYPAD 104
POSITIONING SENSOR 122
TOUCH SENSOR 124
COMPASS SENSOR 126
AMBIENT LIGHT SENSOR 128
AMBIENT TEMPERATURE SENSOR 132
THREE-AXIS ACCELERATION SENSOR 134

Figure 6A

USER'S WIRELESS DEVICE 100

BROWSER 102
UPDATE PRIVACY FEATURES: <ul style="list-style-type: none"><li>[3] AUTHENTICATE A PROGRAM<ul style="list-style-type: none"><li>[a] Request program's public key certificate</li><li>[b] Verify certificate signatures</li><li>[c] Verify validity time</li><li>[d] Verify revocation status</li><li>[e] Check if certificate authority is on trust list</li><li>[f] Flag program as authenticated</li></ul></li><li>[4] REGISTER A PROGRAM<ul style="list-style-type: none"><li>[a] When can the accesses take place</li><li>[b] What data can be accessed</li></ul></li></ul>
KEYPAD 104
POSITIONING SENSOR 122
TOUCH SENSOR 124
COMPASS SENSOR 126
AMBIENT LIGHT SENSOR 128
AMBIENT TEMPERATURE SENSOR 132
THREE-AXIS ACCELERATION SENSOR 134

Figure 6B

USER'S WIRELESS DEVICE 100

BROWSER 102
MANAGE CONTEXT-ACTIVITY PROFILE: <div>[1] AUTOMOBILE [a] day time radio preferences [b] night time radio preferences [c] map display preferences [d] service station preferences  [2] DINING [a] restaurant preferences [b] food preferences</div>
KEYPAD 104
POSITIONING SENSOR 122
TOUCH SENSOR 124
COMPASS SENSOR 126
AMBIENT LIGHT SENSOR 128
AMBIENT TEMPERATURE SENSOR 132
THREE-AXIS ACCELERATION SENSOR 134

Figure 6C

USER'S WIRELESS DEVICE 100

BROWSER 102
MANAGE CONTEXT-ACTIVITY PROFILE: <div>[3] ENTERTAINMENT [a] movie preferences [b] sports preferences  [4] TRAVEL [a] weather forecasts [b] airline preferences [c] hotel preferences [d] car rental preferences</div>
KEYPAD 104
POSITIONING SENSOR 122
TOUCH SENSOR 124
COMPASS SENSOR 126
AMBIENT LIGHT SENSOR 128
AMBIENT TEMPERATURE SENSOR 132
THREE-AXIS ACCELERATION SENSOR 134

Figure 6D

USER'S WIRELESS DEVICE 100

BROWSER 102
REQUEST A RECOMMENDATION: [1] AUTOMOBILE ACTIVITIES [a] request day time radio recommendation [b] request night time radio recommendation [c] request map recommendation [d] request service station recommendation [2] DINING ACTIVITIES [a] request restaurant recommendation [b] request food recommendation
KEYPAD 104
POSITIONING SENSOR 122
TOUCH SENSOR 124
COMPASS SENSOR 126
AMBIENT LIGHT SENSOR 128
AMBIENT TEMPERATURE SENSOR 132
THREE-AXIS ACCELERATION SENSOR 134

Figure 6E

USER'S WIRELESS DEVICE 100

BROWSER 102
REQUEST A RECOMMENDATION: [3] ENTERTAINMENT ACTIVITIES [a] request movie recommendation [b] request sports recommendation [4] TRAVEL ACTIVITIES [a] request weather forecasts [b] request airline recommendation [c] request hotel recommendation [d] request car rental recommendation
KEYPAD 104
POSITIONING SENSOR 122
TOUCH SENSOR 124
COMPASS SENSOR 126
AMBIENT LIGHT SENSOR 128
AMBIENT TEMPERATURE SENSOR 132
THREE-AXIS ACCELERATION SENSOR 134

Figure 6F

USER'S WIRELESS DEVICE 100

<b>BROWSER 102</b>
<p>ACTIVITY: DINING - restaurant</p> <p>CONTEXT:</p> <p>LOCAL TIME: 2001/05/08/8:00 PM</p> <p>LOCATION: Beale Street, Memphis, TN</p> <p>LIGHT LEVEL - Street Lights /Night</p> <p>AMBIENT TEMPERATURE - 22 C</p> <p>SPEED - ACCELERATION - 0</p> <p>SERVICE RECOMMENDATIONS:</p> <p>Joe's Beef Barbecue Restaurant</p> <p>Elvis' Place</p> <p>The Blues Diner</p>
<b>KEYPAD 104</b>
<b>POSITIONING SENSOR 122</b>
<b>TOUCH SENSOR 124</b>
<b>COMPASS SENSOR 126</b>
<b>AMBIENT LIGHT SENSOR 128</b>
<b>AMBIENT TEMPERATURE SENSOR 132</b>
<b>THREE-AXIS ACCELERATION SENSOR 134</b>

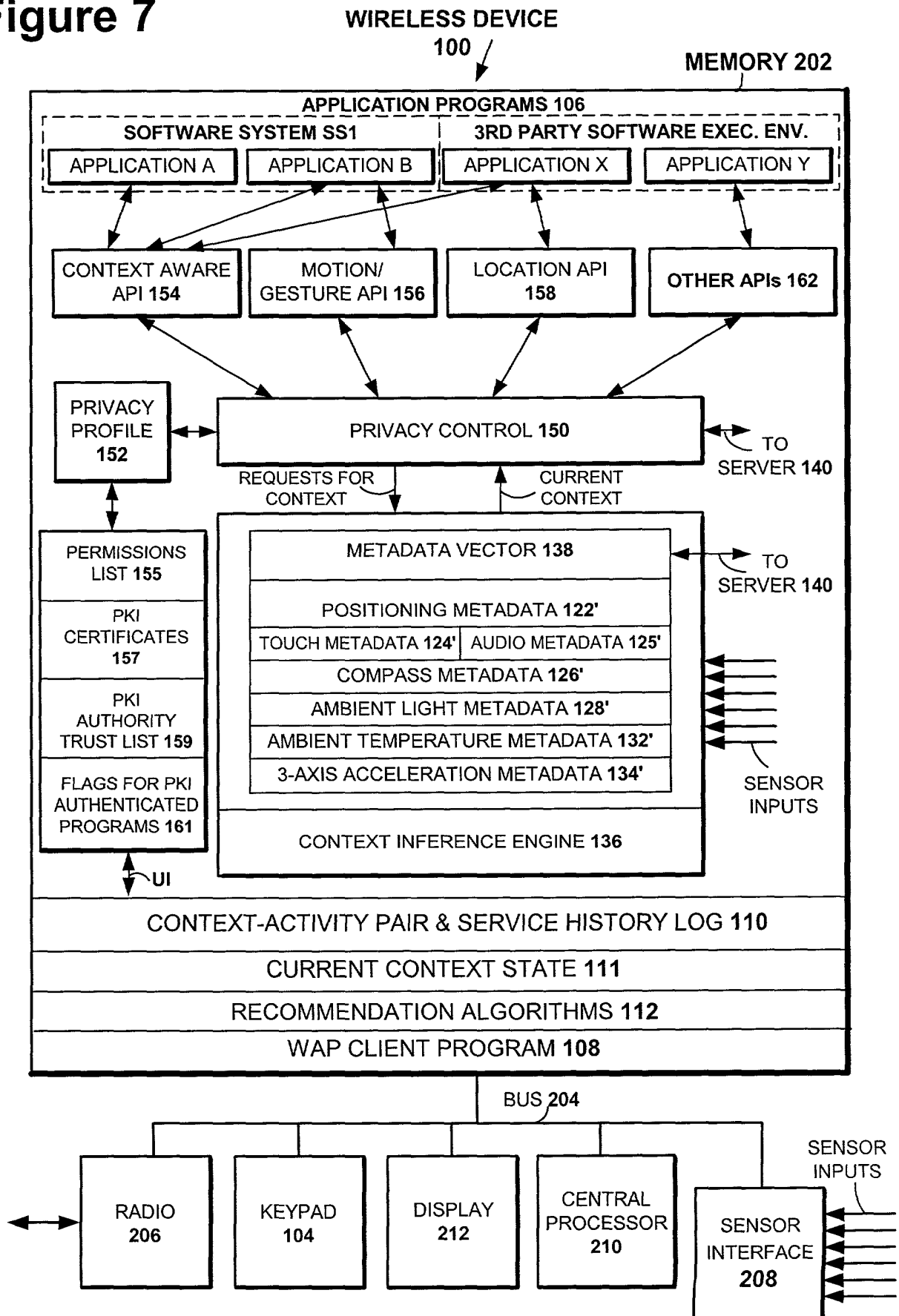
Figure 6G

USER'S WIRELESS DEVICE 100

<b>BROWSER 102</b>
<p>ACTIVITY: DINING - restaurant</p> <p>CONTEXT:</p> <p>LOCAL TIME: 2001/06/08/7:30 AM</p> <p>LOCATION: Beale Street, Memphis, TN</p> <p>LIGHT LEVEL - Daylight</p> <p>AMBIENT TEMPERATURE - 16 C</p> <p>SPEED - ACCELERATION - 0</p> <p>SERVICE RECOMMENDATIONS:</p> <p>Pancake Restaurant</p> <p>Great Start Diner</p> <p>Betty's Homestyle Breakfast</p>
<b>KEYPAD 104</b>
<b>POSITIONING SENSOR 122</b>
<b>TOUCH SENSOR 124</b>
<b>COMPASS SENSOR 126</b>
<b>AMBIENT LIGHT SENSOR 128</b>
<b>AMBIENT TEMPERATURE SENSOR 132</b>
<b>THREE-AXIS ACCELERATION SENSOR 134</b>

Figure 6H

# Figure 7



# Figure 7A

USER'S WIRELESS DEVICE 100

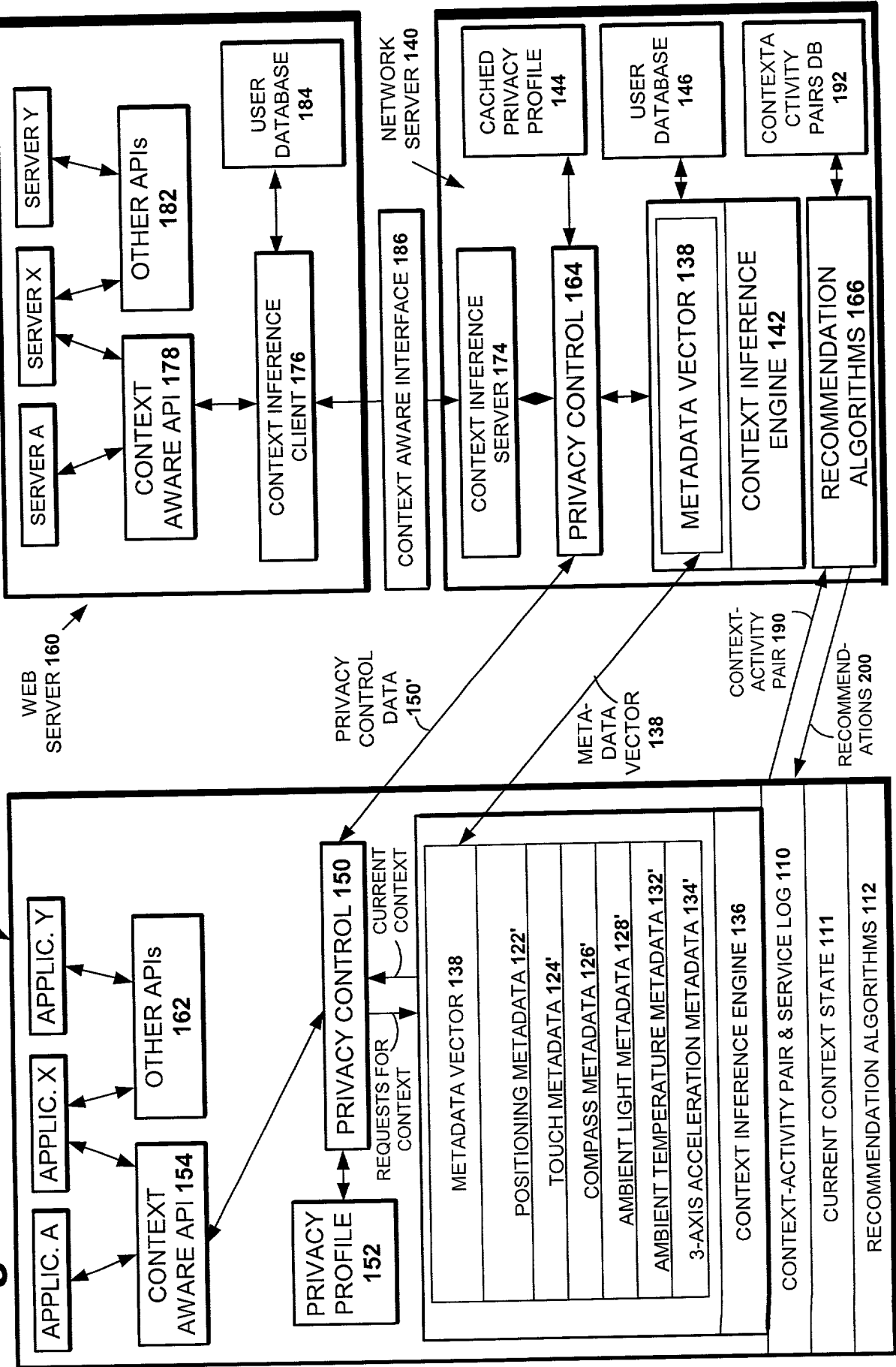
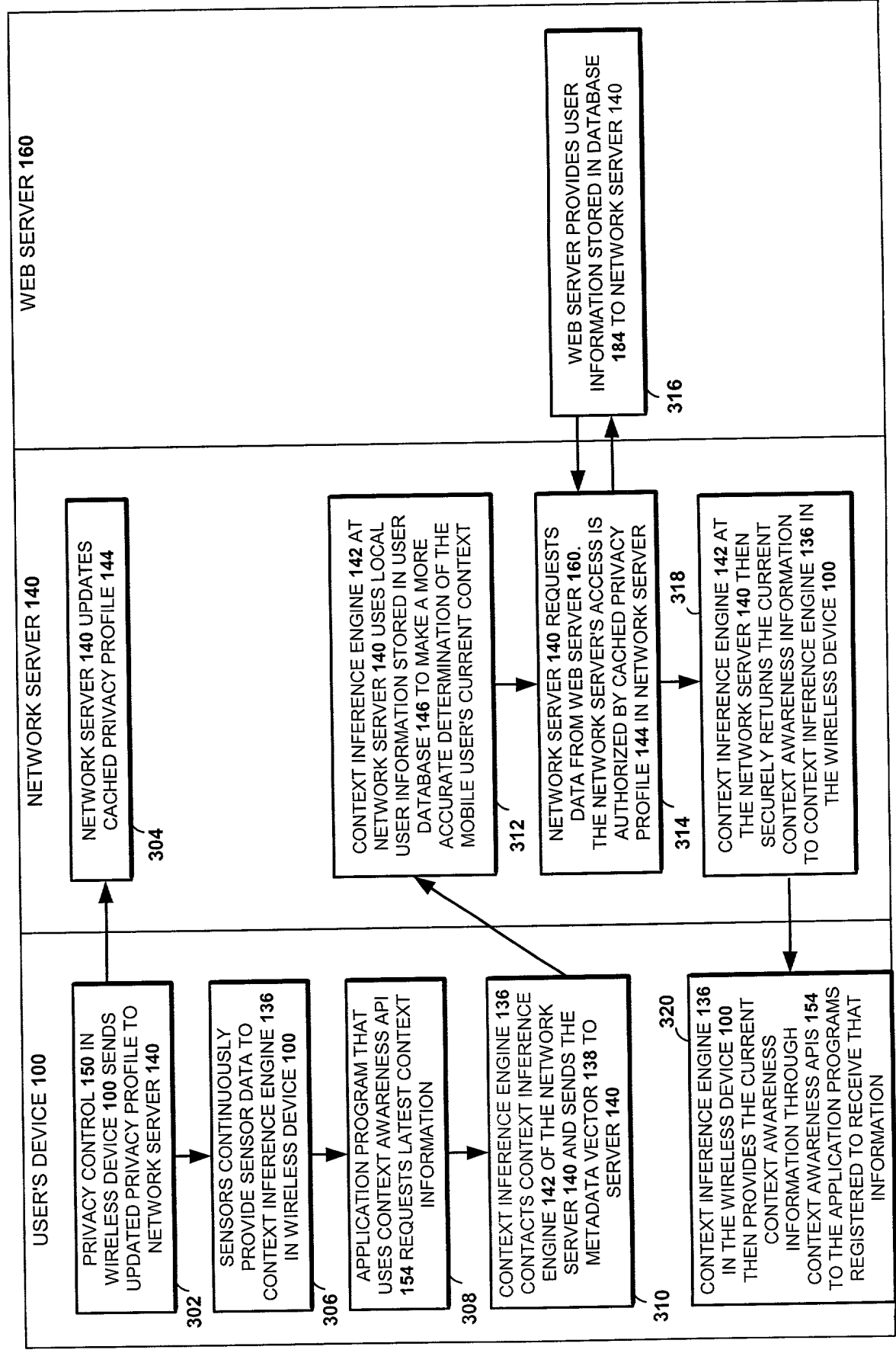


Figure 8



**Figure 8A**

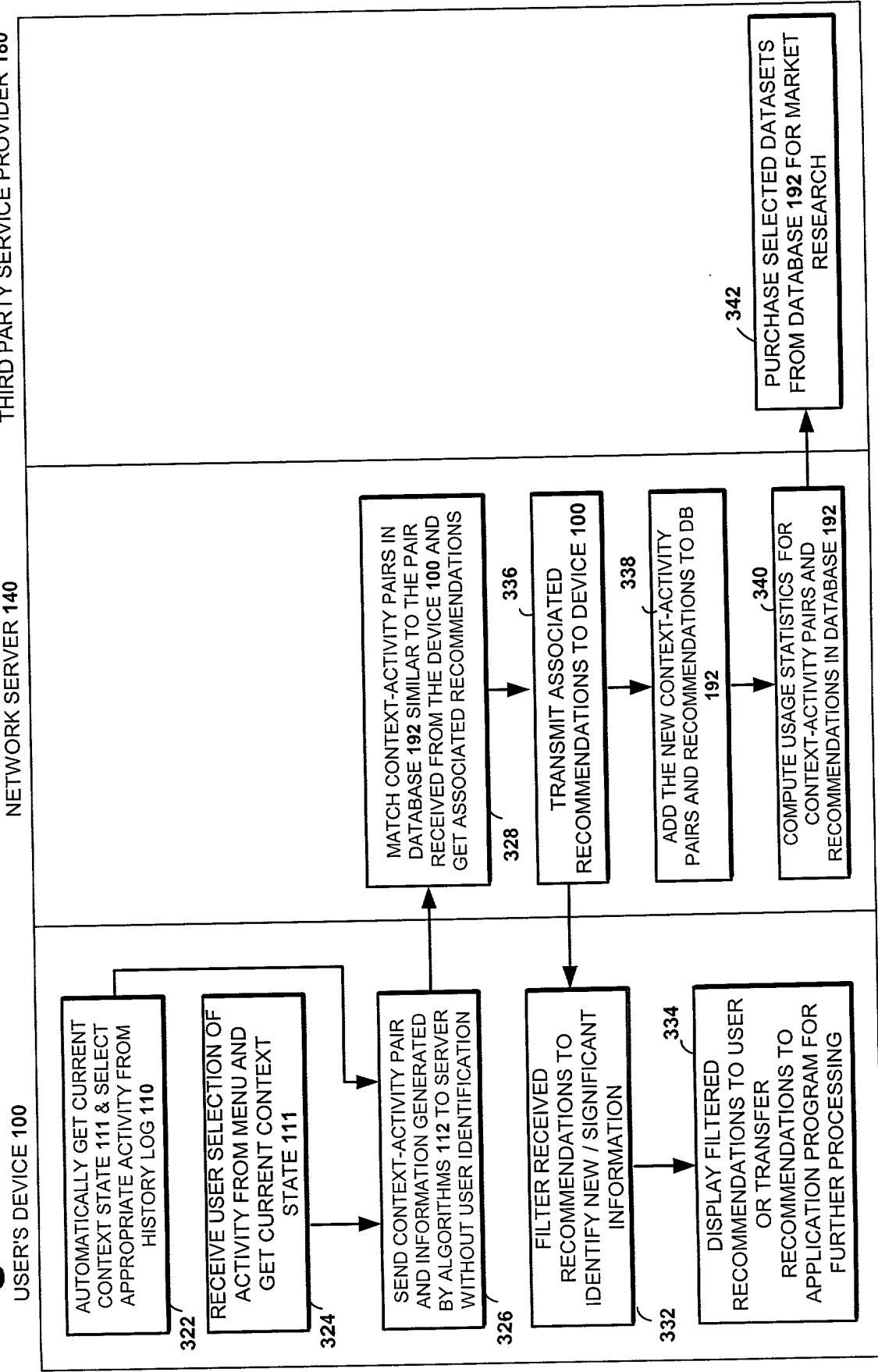




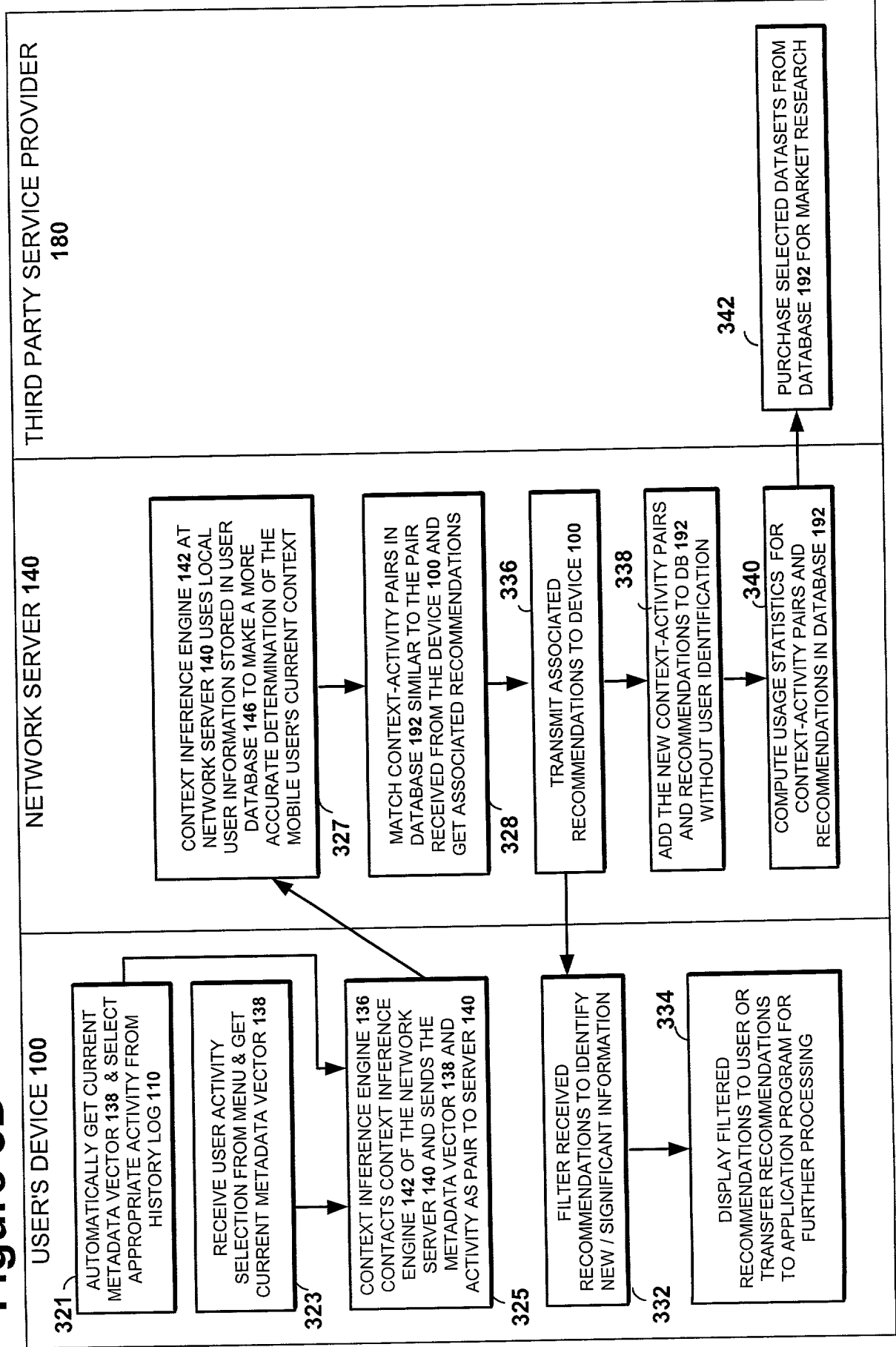
Figure 8B

CONTEXT-ACTIVITY PAIRS AND SERVICES DATABASE 192 IN SERVER 140		
CONTEXT-ACTIVITY PAIRS	SERVICE RECOMMENDATIONS	NUMBER TIMES RECOMMENDED
ACTIVITY: DINING - restaurant CONTEXT: LOCAL TIME: 6:00 PM - 11:59 PM LOCATION: Beale St, Memphis TN LIGHT LEVEL: Night AMBIENT TEMPERATURE: 15 C - 25 C SPEED - ACCELERATION: 0 - 50 kph	Joe's Beef Barbecue Restaurant  Elvis' Place  The Blues Diner  The Gourmet Restaurant  Dan's Fast Food Restaurant	R=20  R=33  R=18  R=25  R=40
ACTIVITY: DINING - restaurant CONTEXT: LOCAL TIME: 5:00 AM - 10:59 AM LOCATION: Beale St, Memphis TN LIGHT LEVEL: Daylight AMBIENT TEMPERATURE: 15 C - 25 C SPEED - ACCELERATION: 0 - 50 kph	Pancake Restaurant  Great Start Diner  Betty's Homestyle Breakfast  Mike's Quick Breakfast  Dan's Fast Food Restaurant	R=120  R=100  R=130  R=150  R=120

Figure 8C

CONTEXT-ACTIVITY PAIRS AND SERVICE HISTORY LOG 110 IN DEVICE 100		RECEIVE BUFFER IN DEVICE 100
CONTEXT-ACTIVITY PAIR HISTORY	HISTORY OF SERVICES USED	RECOMMENDATIONS FROM SERVER
ACTIVITY: DINING - restaurant CONTEXT: LOCAL TIME: 6:00 PM - 11:59 PM LOCATION: Beale St, Memphis TN LIGHT LEVEL: Night AMBIENT TEMPERATURE: 15 C - 25 C SPEED - ACCELERATION: 0 - 50 kph	The Gourmet Restaurant [USER'S RATING = 8] Dan's Fast Food Restaurant [USER'S RATING = 6]	Joe's Beef Barbecue Restaurant R=20 Elvis' Place R=33 The Blues Diner R=18 The Gourmet Restaurant R=25 Dan's Fast Food Restaurant R=40
ACTIVITY: DINING - restaurant CONTEXT: LOCAL TIME: 5:00 AM - 10:59 AM LOCATION: Beale St, Memphis TN LIGHT LEVEL: Daylight AMBIENT TEMPERATURE: 15 C - 25 C SPEED - ACCELERATION: 0 - 50 kph	Mike's Quick Breakfasts [USER'S RATING = 8] Dan's Fast Food Restaurant [USER'S RATING = 5]	Pancake Restaurant R=120 Great Start Diner R=100 Betty's Homestyle Breakfast R=130 Mike's Quick Breakfasts R=150 Dan's Fast Food Restaurant R=120

# Figure 8D



# Figure 8E

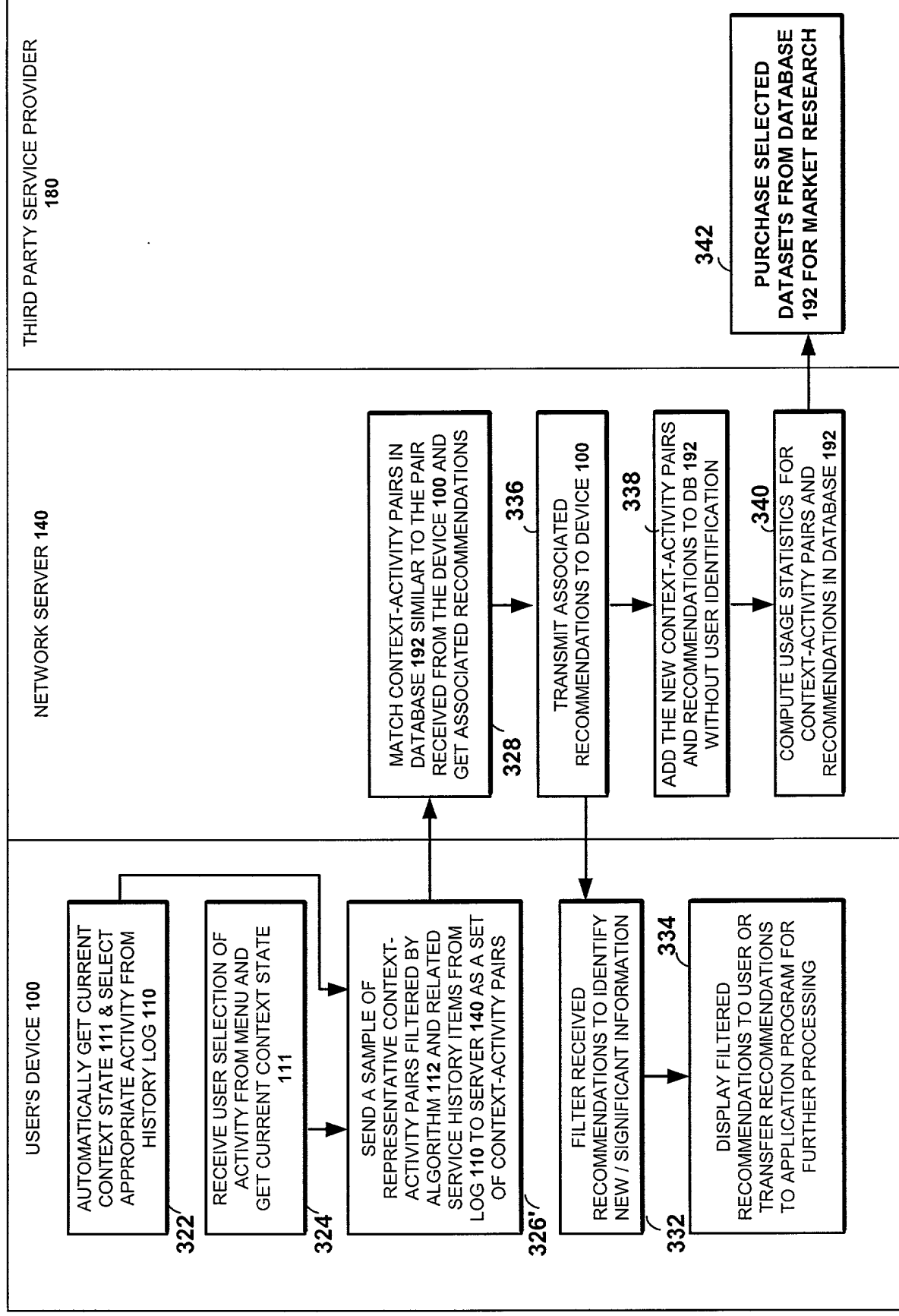
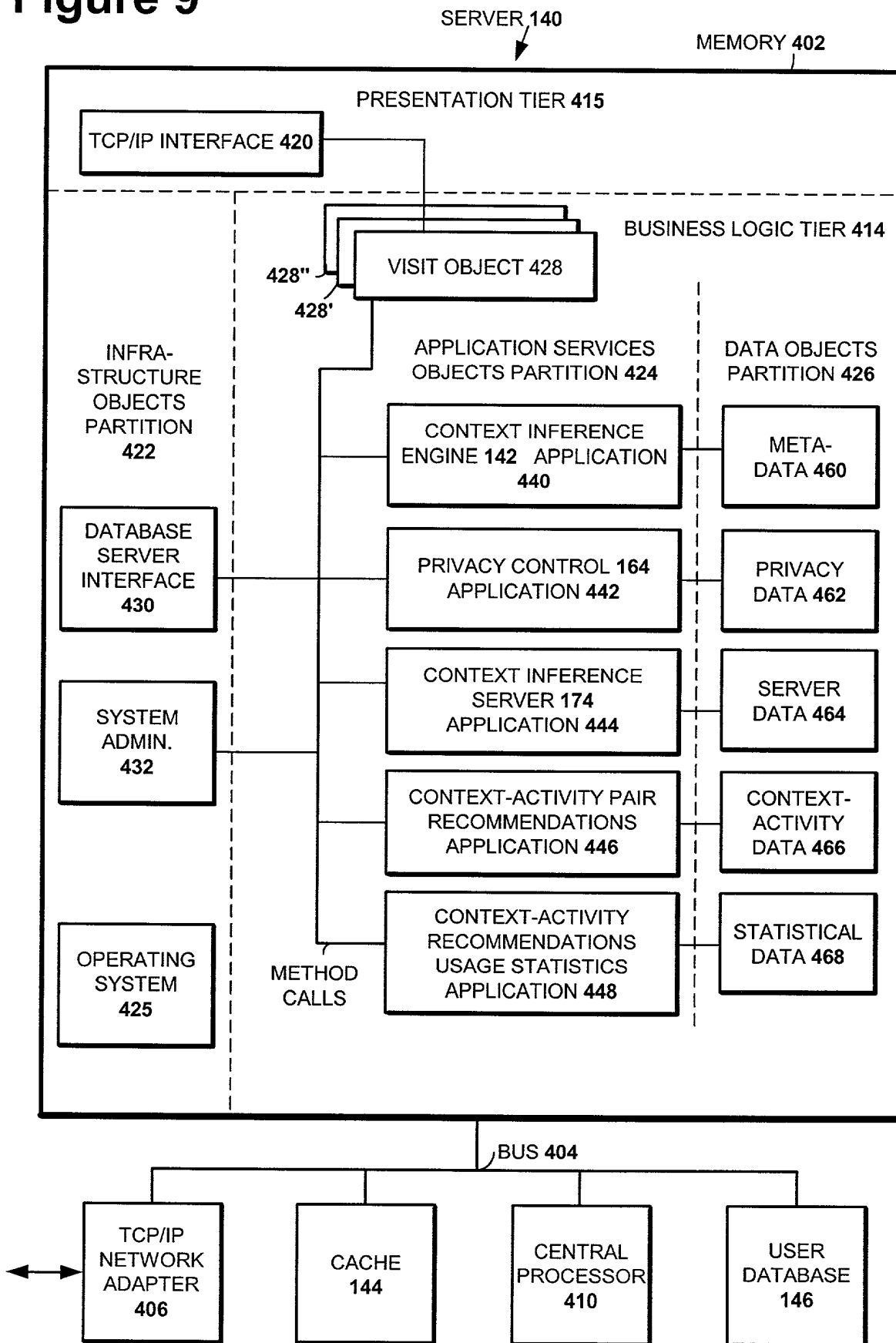


Figure 9



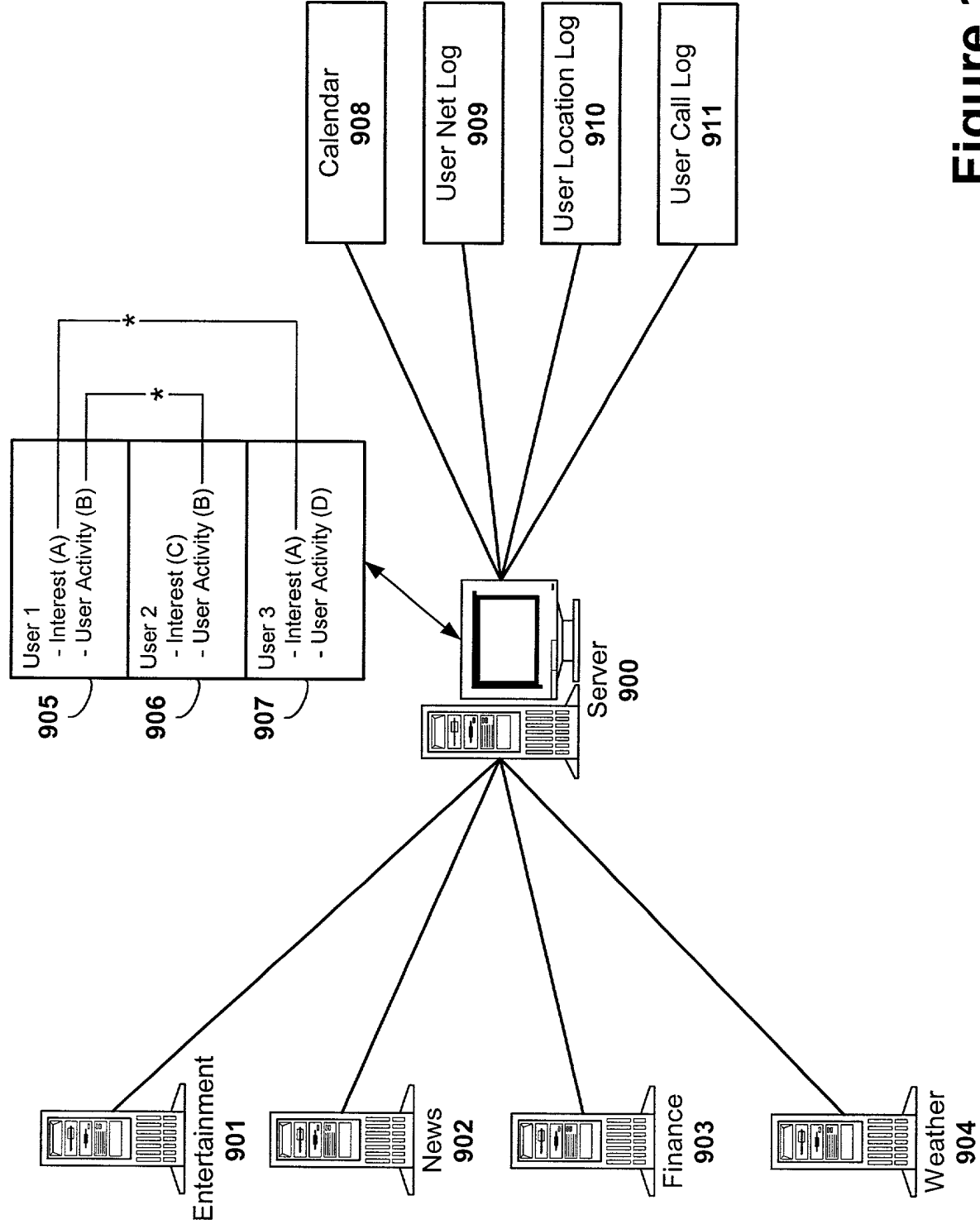


Figure 10